Terrain Manipulation in North America Ski Maps: A Preliminary Study of Four Artists

Alex Tait, International Mapping
Ellicott City, Maryland, United States

Presented at 2014 ICA Mountain Cartography Workshop, Banff, AB, Canada

Mountain Ski Maps

[From TAIT, 2008, ICA-Mountain Cartography Workshop]

Survey of North American Mountain Ski Maps

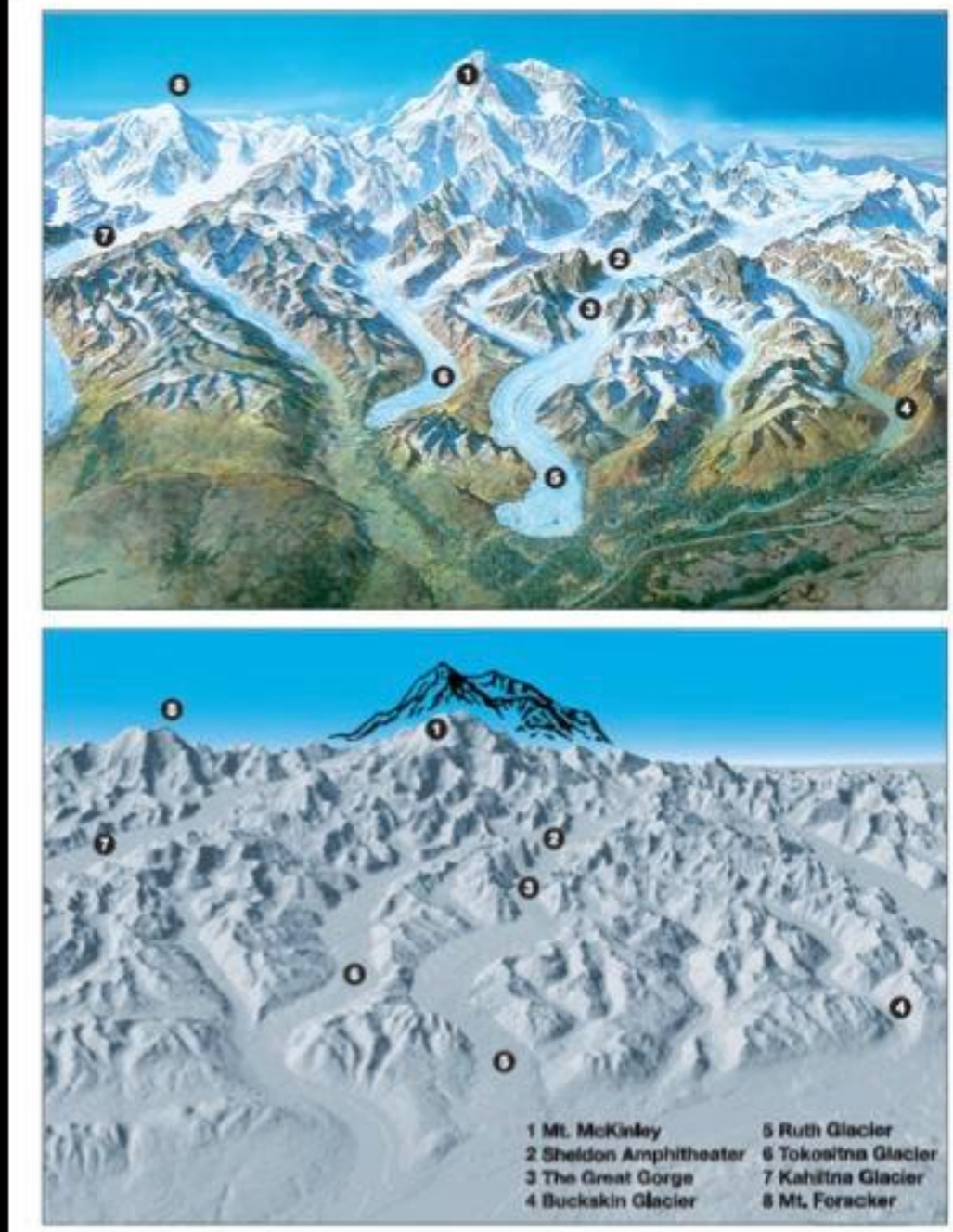
	All Resorts	%	Major Resorts	%
View type				
panoramic	368	86%	100	100%
profile	36	8%	0	0%
planimetric	24	6%	0	0%
Creation method				
painted	307	72%	89	89%
illustrated	85	20%	7	7%
annotated photo	24	6%	1	1%
computer rendered	12	3%	3	3%
Total	**428**	**100%**	**100**	**100%**

[From TAIT, 2008, ICA-Mountain Cartography Workshop]

Credited Artists in survey of current maps

James Niehues	112 maps (57 of top 100)
Peter Powers	25
Gary Milliken	8
Bill Brown	4
Don Moss	4
Murray Hay	3
K.M. Mastin	2
Hal Shelton	2
A. Tait	2
Ron Bomba	1
Hans Schmidt	1
Peter Kelley	1
J.C. Hetz	1
Unknown/unreadable	277

Compare Painting to DEM Generated Landscape



Denali National Park
Digital source: 1:63,360-scale USGS DEMs

[From PATTERSON, 2000, ICA-Mountain Cartography Workshop]

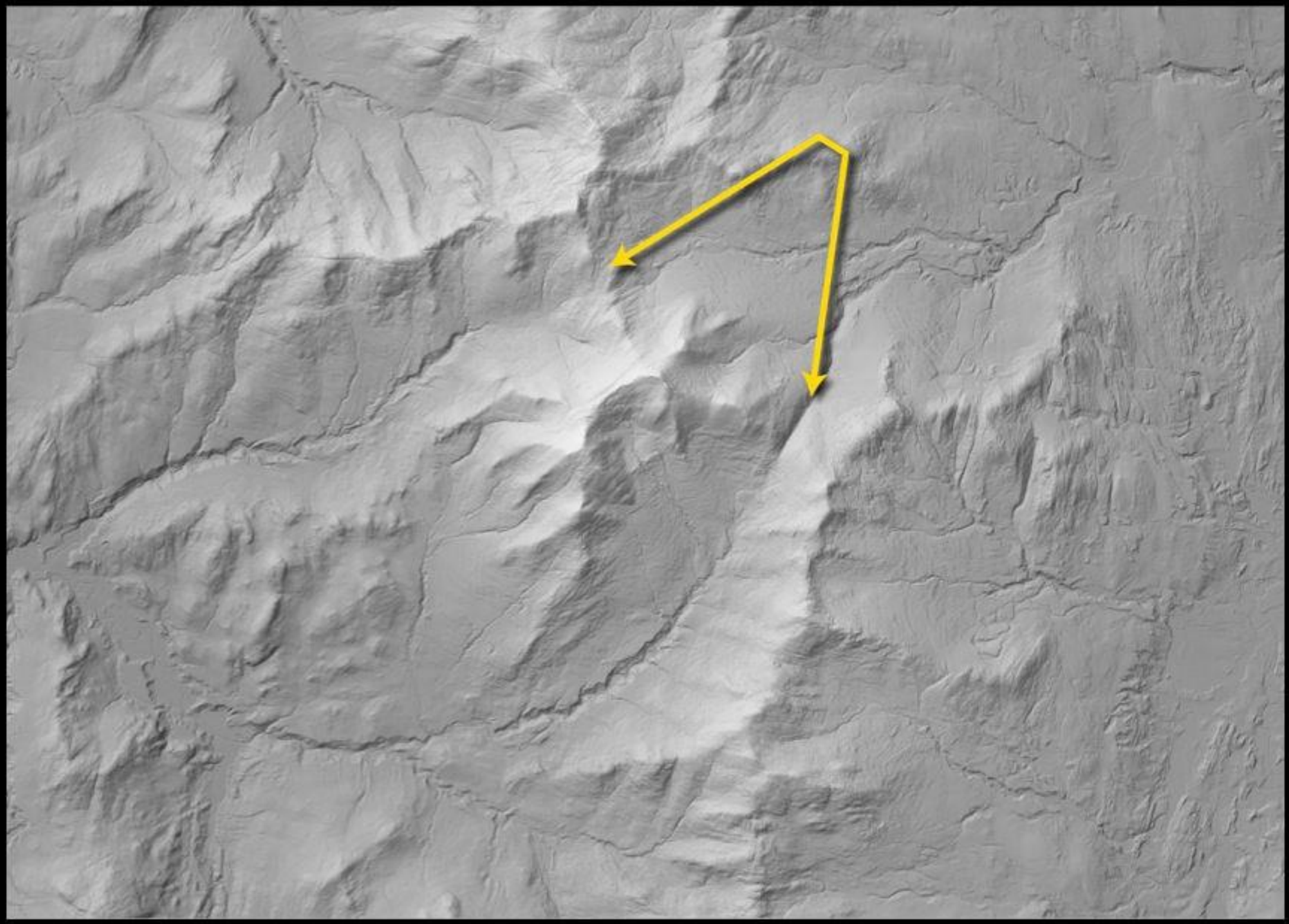
Jay Peak, Vermont

Location

Jay Peak, 2008, by James Niehues

Jay Peak, Vermont

Jay Peak, approximate camera location



Google Earth, 1x vertical

Jay Peak, Vermont

James Niehues

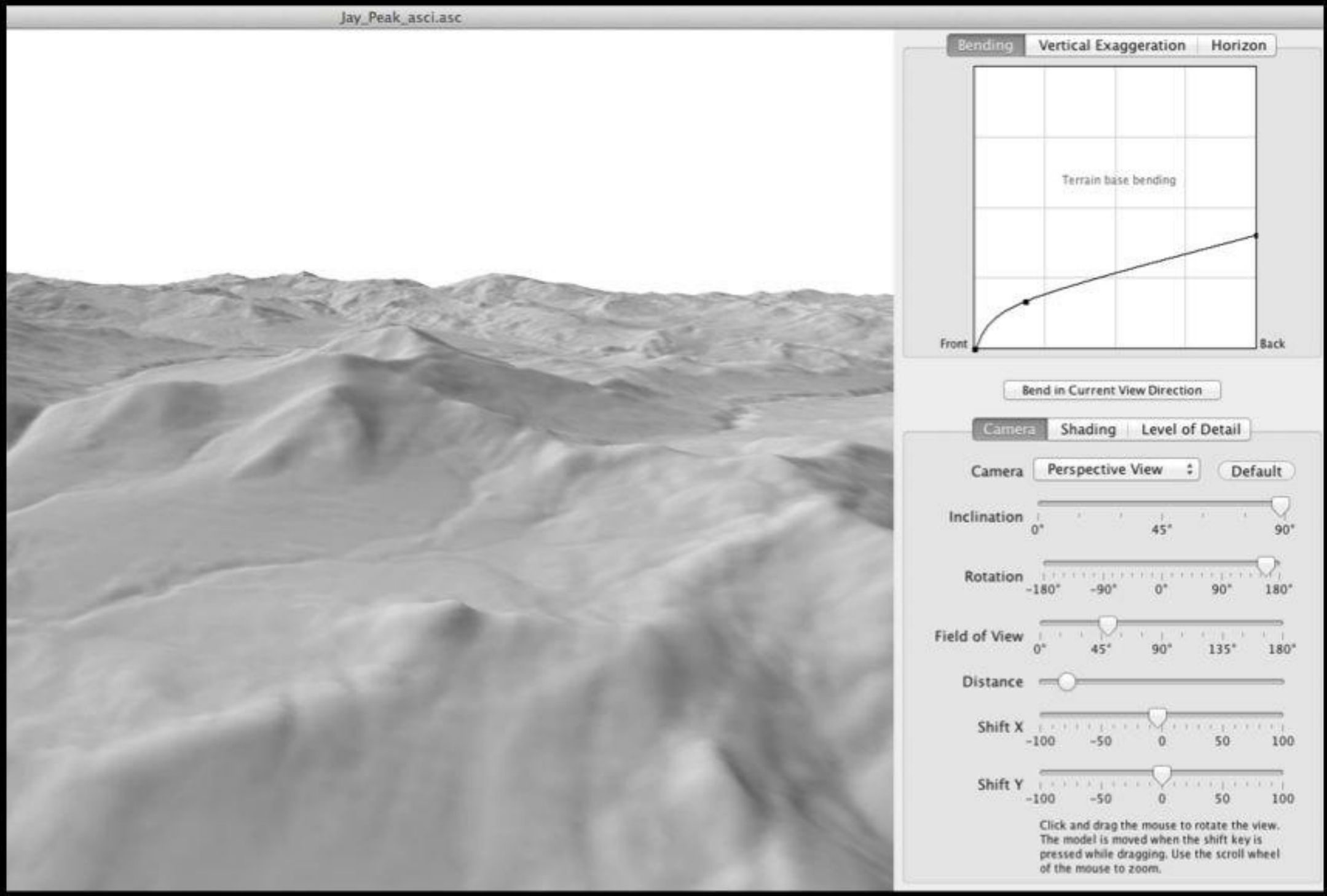
Jay Peak, Vermont

Simple NSD render, 1.15x vertical, 35mm camera

Jay Peak, Vermont

Jay Peak, Vermont

Curved projection plane



Jay Peak, Vermont

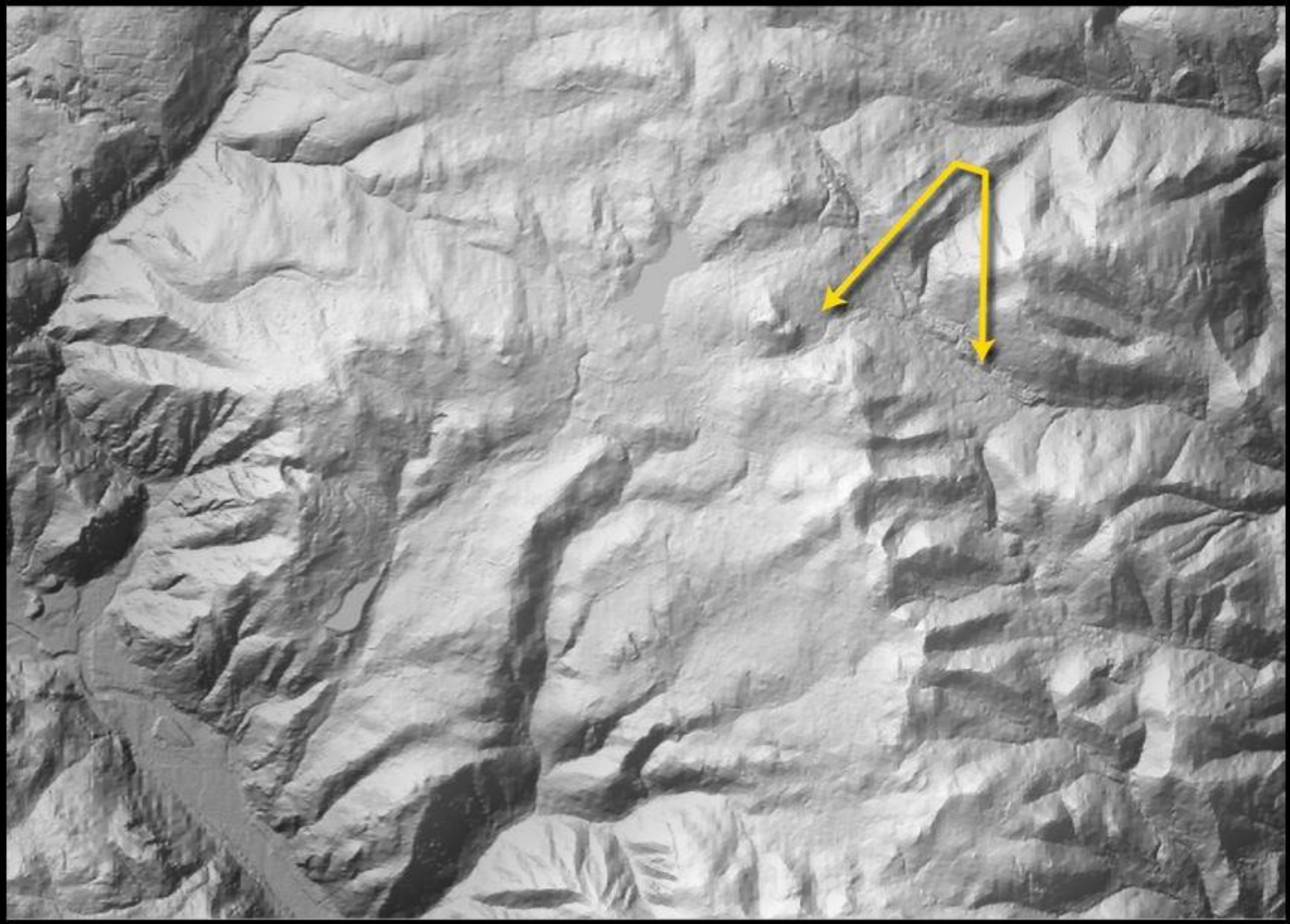
Apex Mountain, British Columbia

Location

Apex Mountain, 1993–2014, Murray Hay

Apex Mountain, British Columbia

Apex Mountain, approximate camera location



Google Earth, 1x vertical

Apex Mountain, British Columbia

Google Earth, 1.25x vertical, better

Apex Mountain, British Columbia

Murray Hay

Apex Mountain, British Columbia

Simple NSD render, 1.5x vertical, 55mm camera

Apex Mountain, British Columbia

Apex Mountain, British Columbia

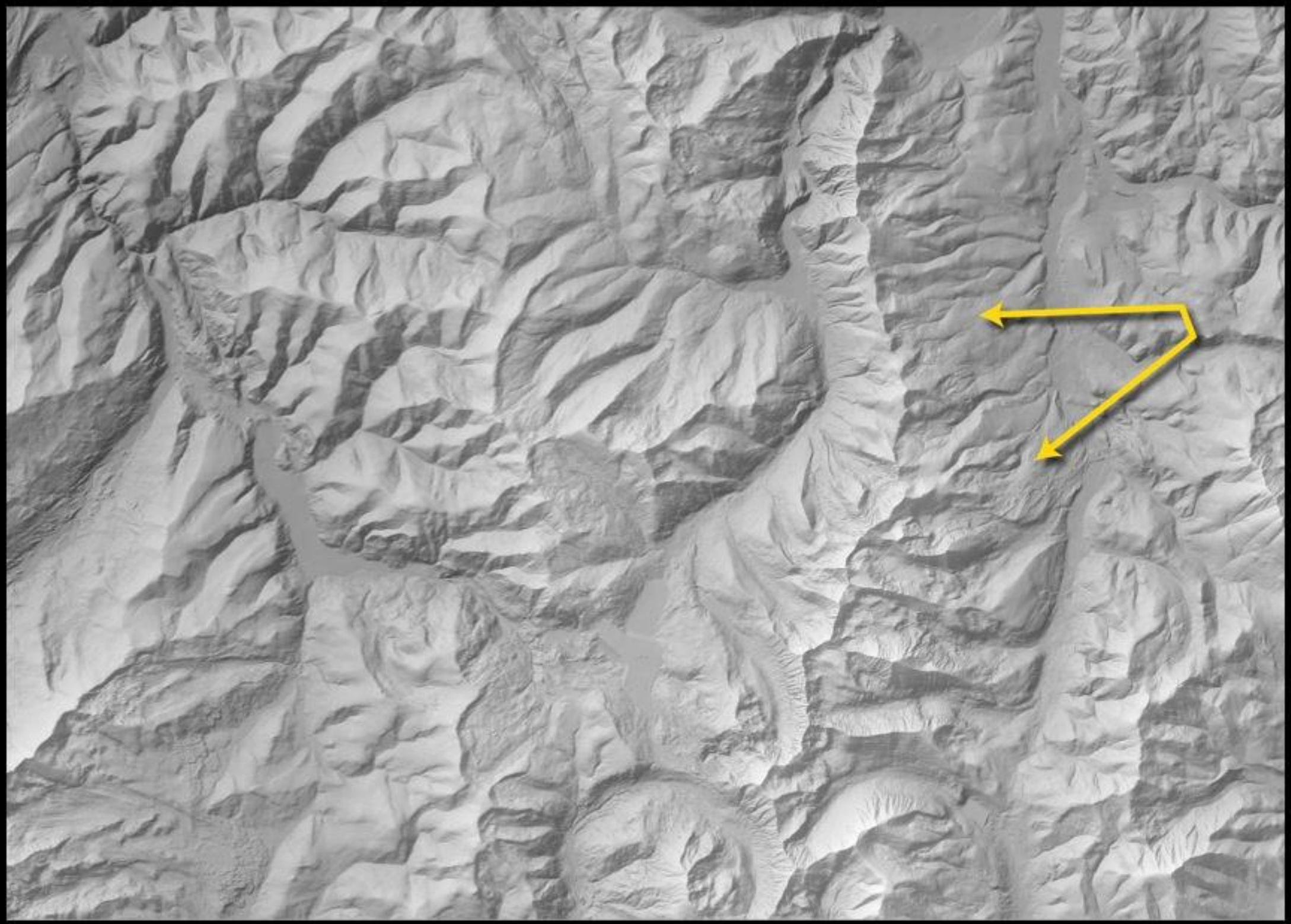
Breckenridge, Colorado

Location

Breckenridge, 1980, Bill Brown

Breckenridge, Colorado

Breckenridge, approximate camera location



Google Earth, 1x vertical

Breckenridge, Colorado

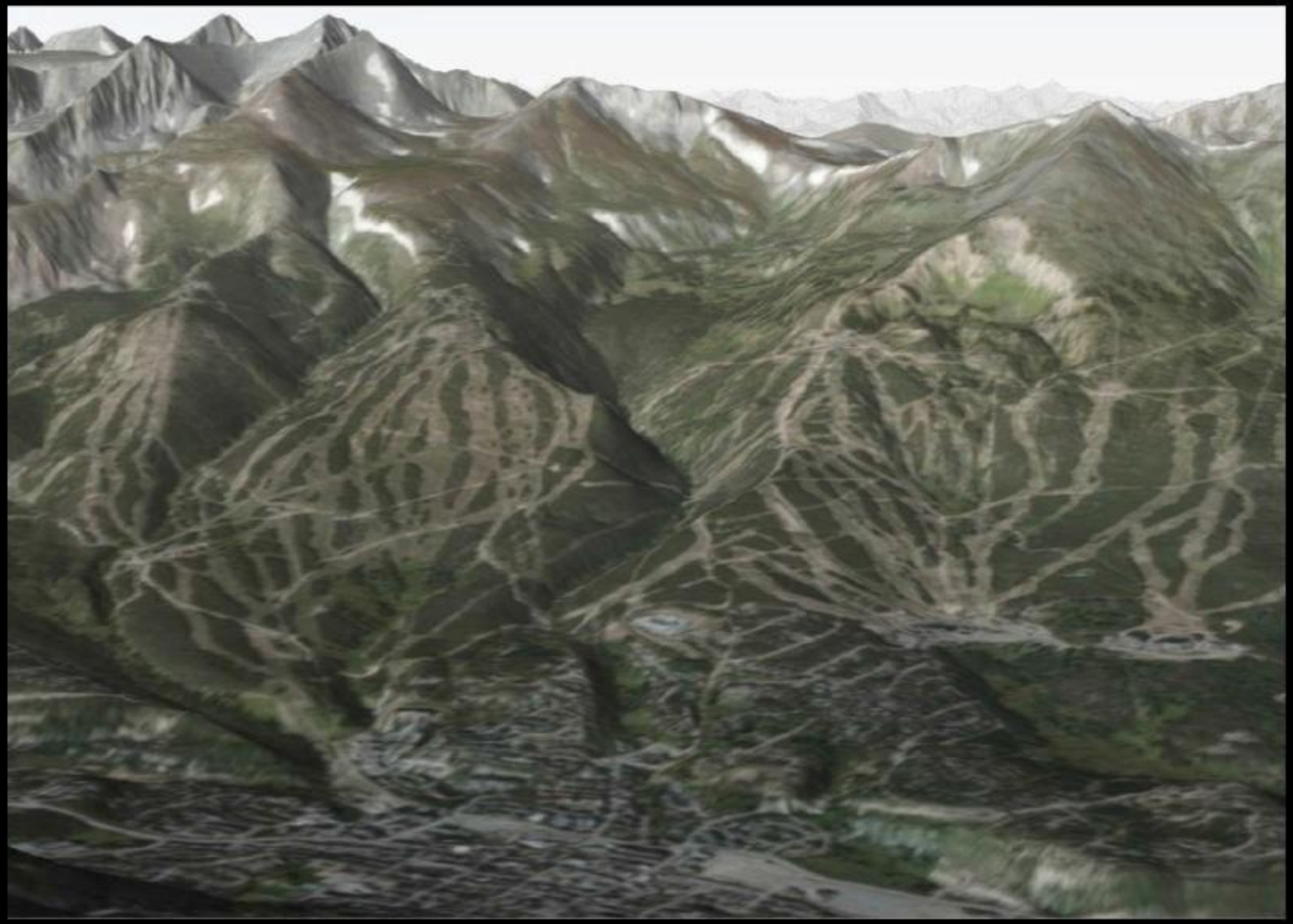
Google Earth, 1.5x vertical, best fit

Breckenridge, Colorado

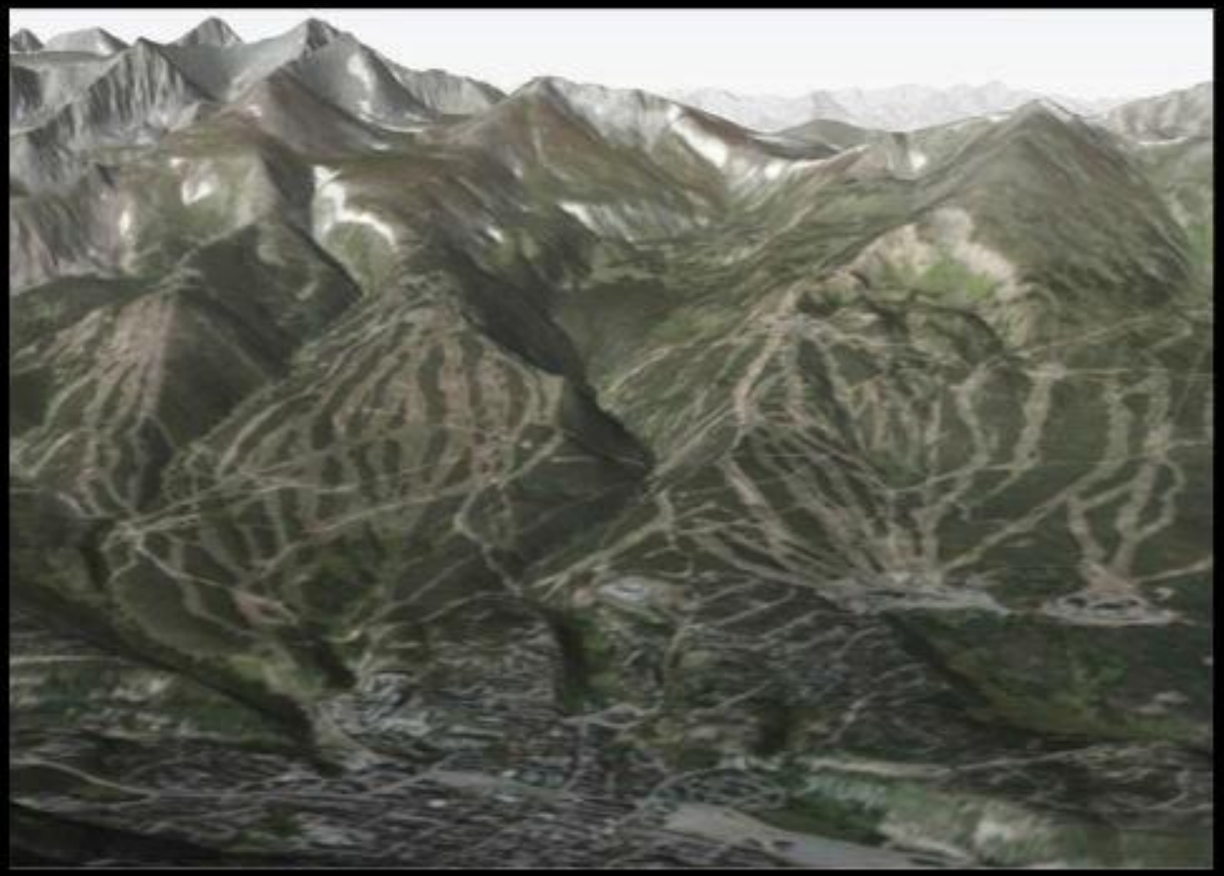
Bill Brown

Breckenridge, Colorado

Simple NSD render, 1.4x vertical, 65mm camera



Breckenridge, Colorado



Breckenridge, Colorado

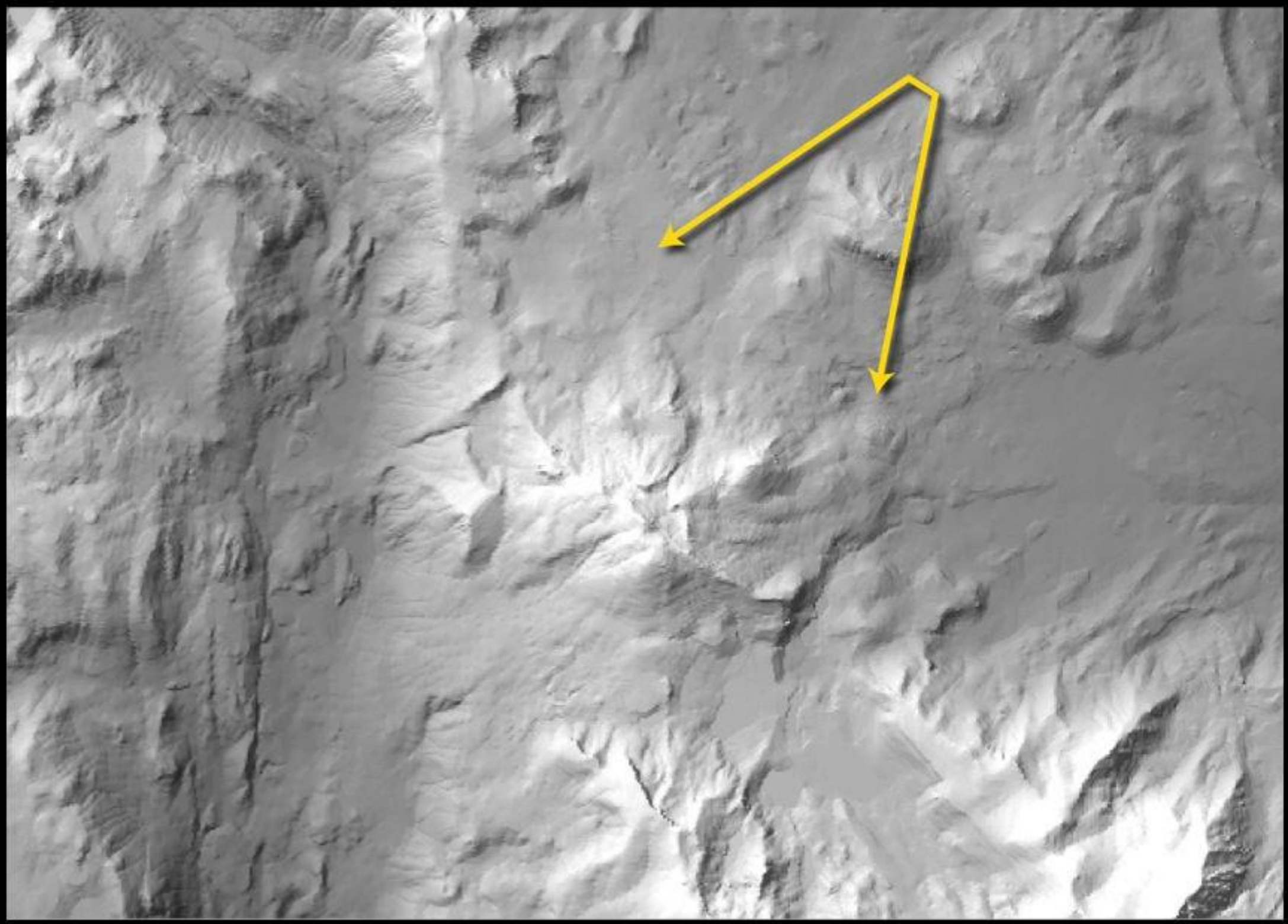
Mammoth Mountain, California

Location

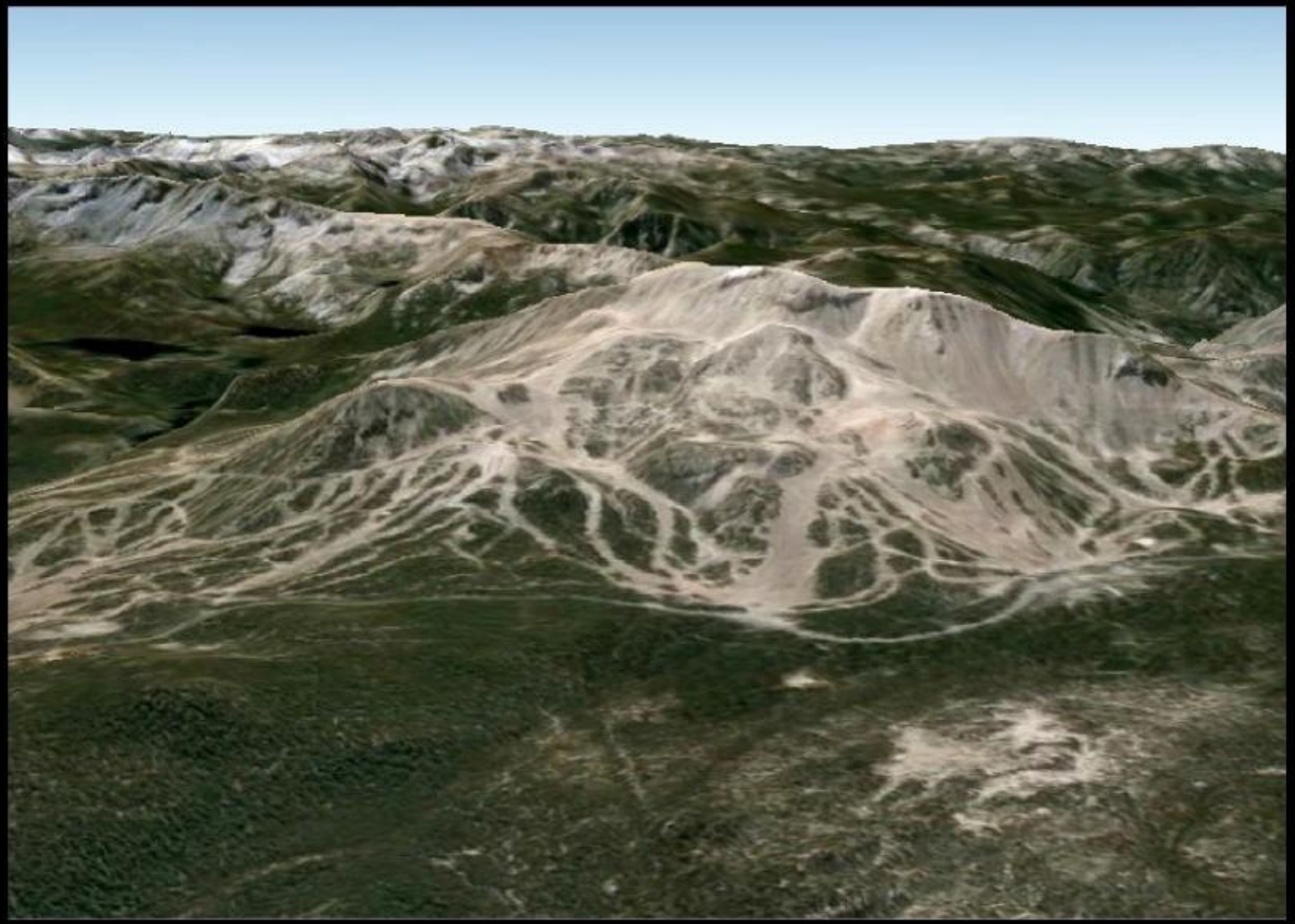
Mammoth Mountain, 1976–2008, Hal Shelton

Mammoth Mountain, California

Mammoth Mountain, approximate camera location



Google Earth, 1x vertical, match horizon



Mammoth Mountain, California

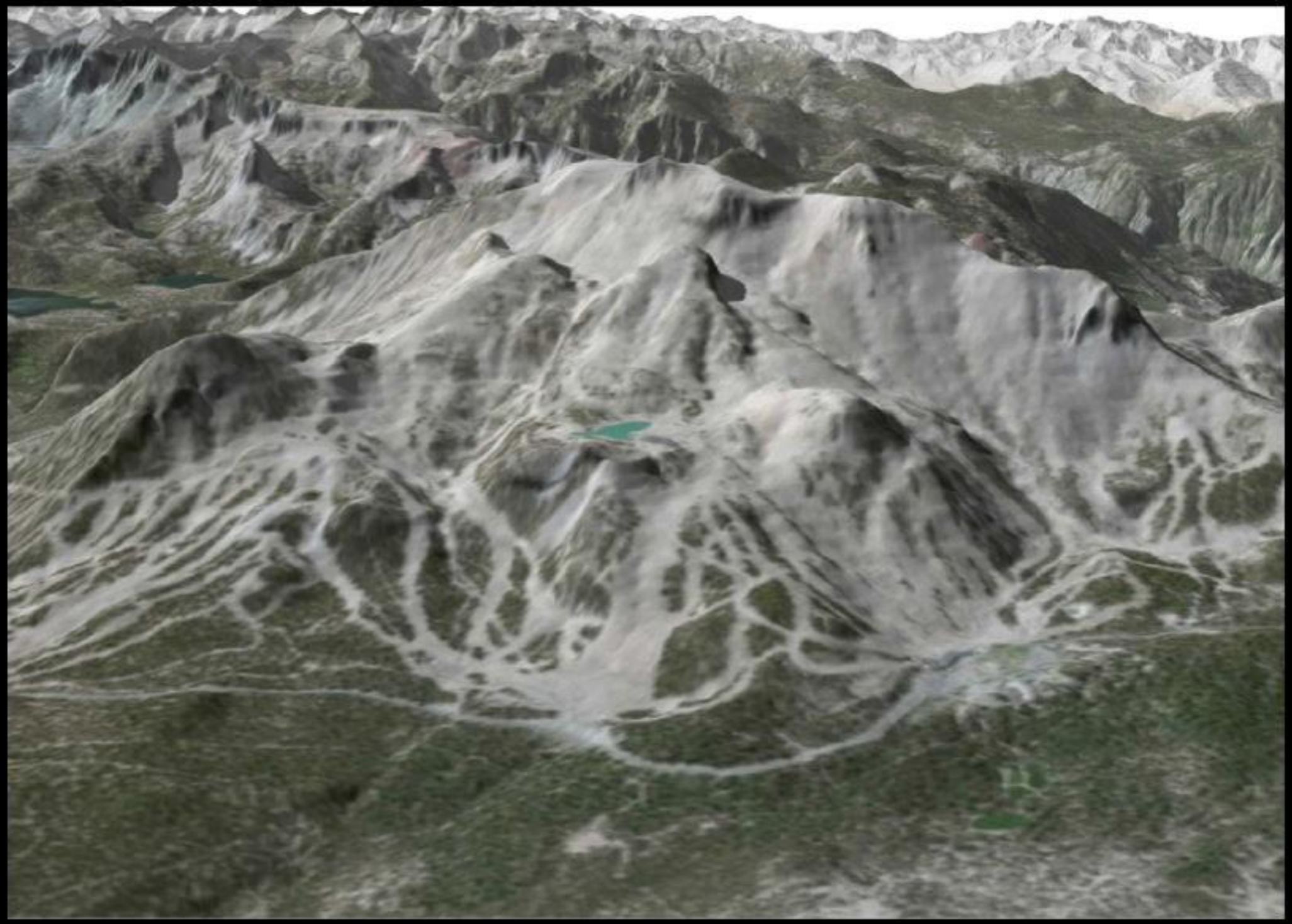
Google Earth, 1.25x vertical, match mountain

Mammoth Mountain, California

Hal Shelton

Mammoth Mountain, California

1.3x vertical, 50mm camera, 90% x-compression, angle “A”



Mammoth Mountain, California

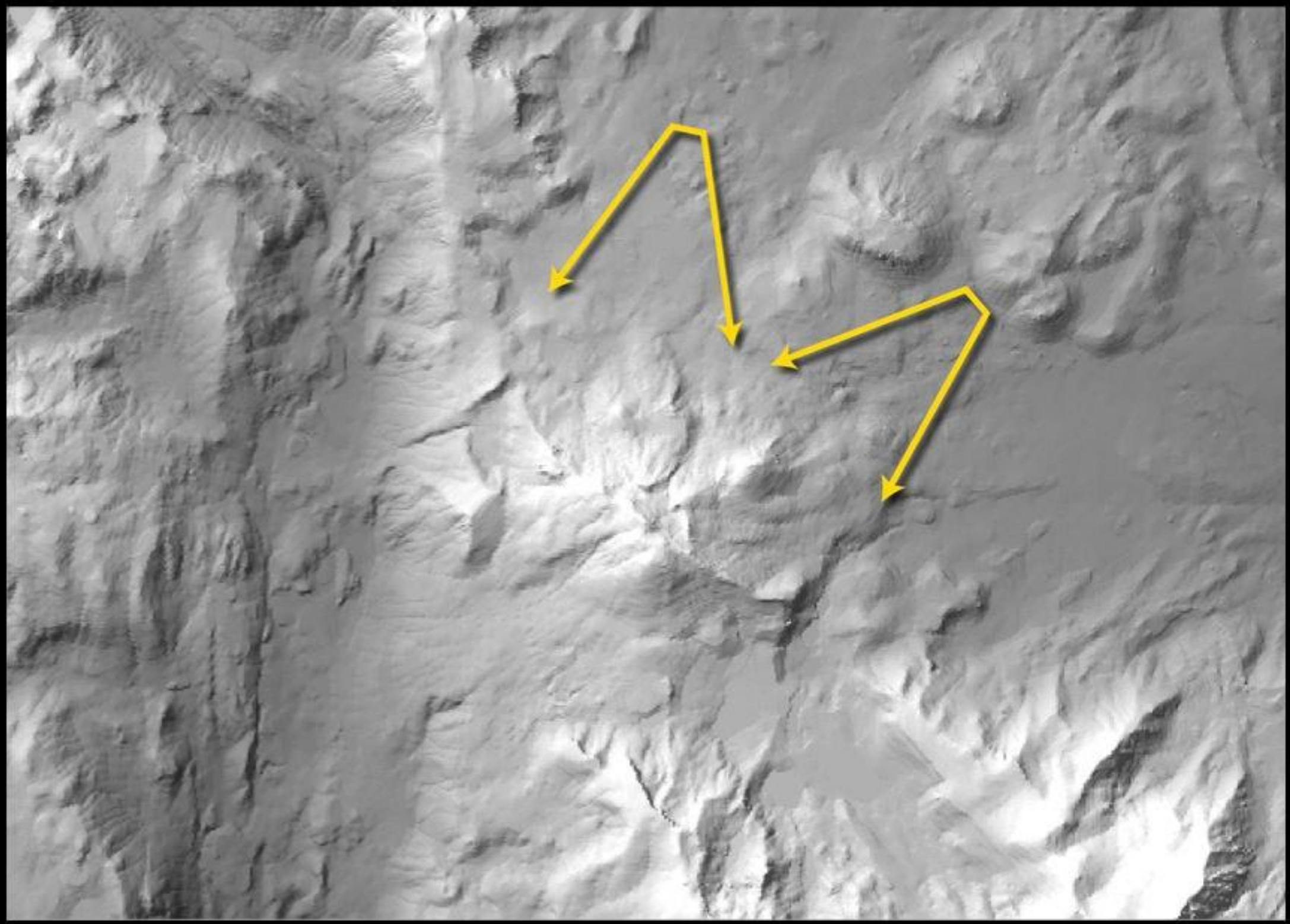
1.3x vertical, 50mm camera, 90% x-compression, rotate 9°, angle “B”

Mammoth Mountain, California

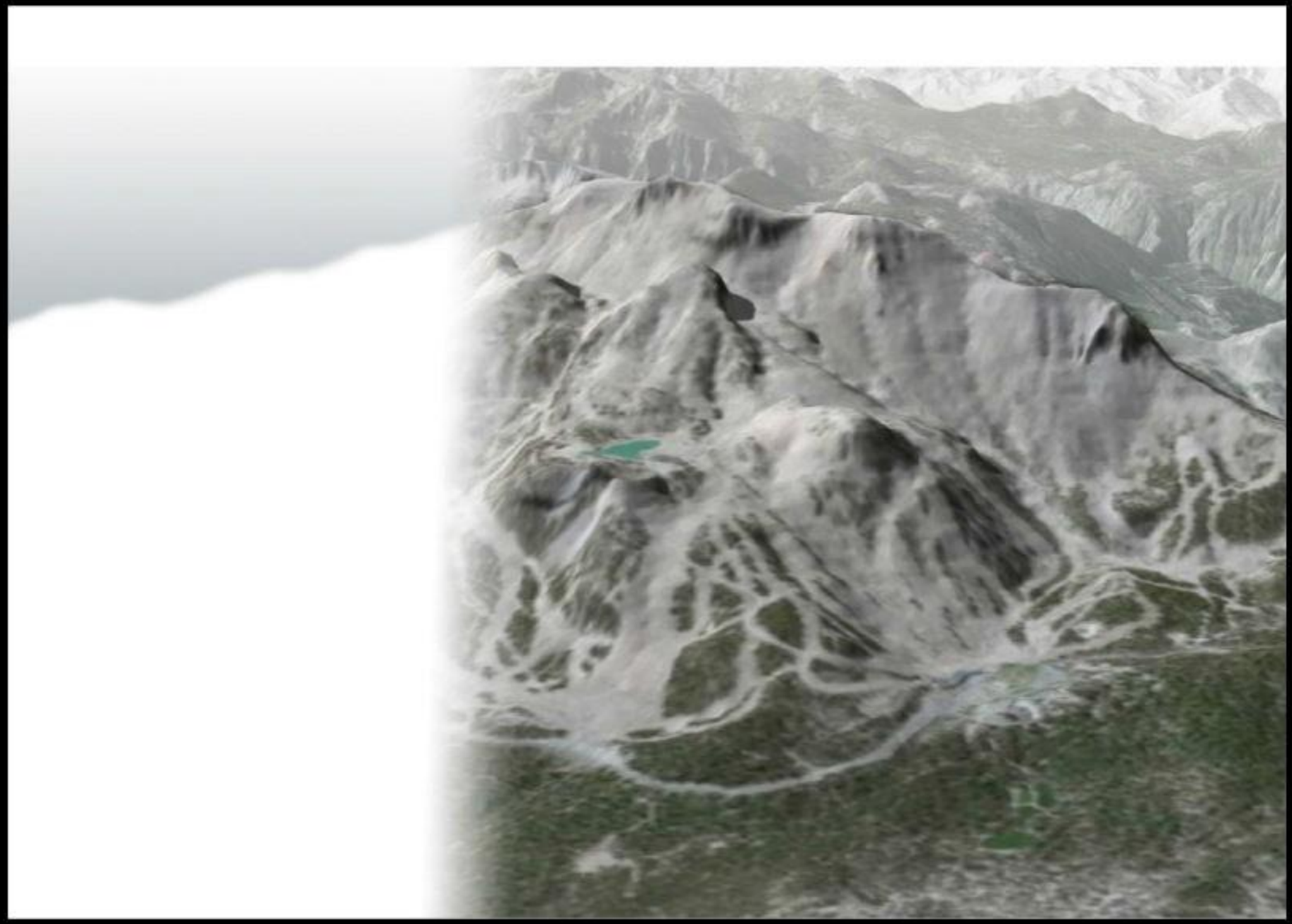
Hal Shelton

Mammoth Mountain, California

Mammoth Mountain, two camera locations!



Angle “A”



Mammoth Mountain, California

Angle “B”

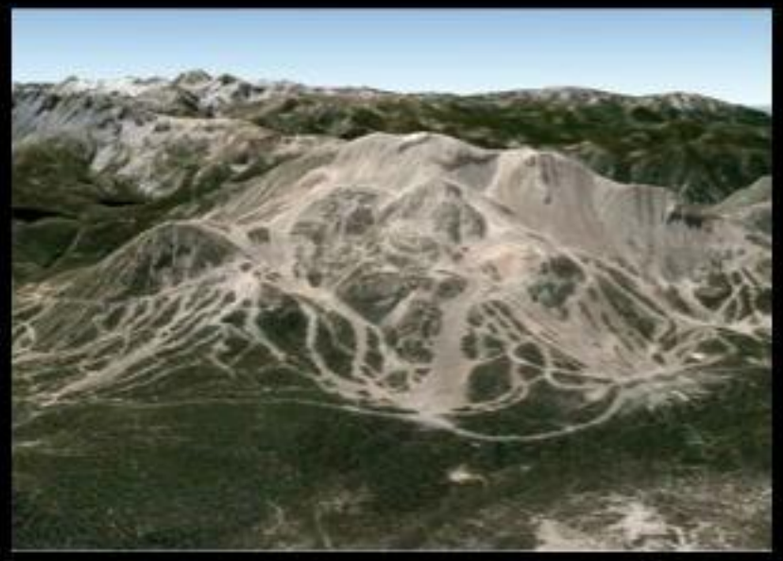
Mammoth Mountain, California

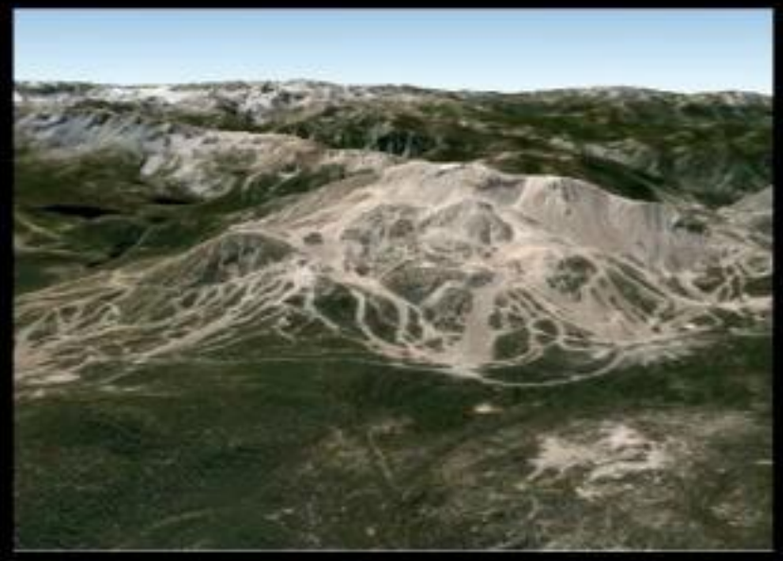
Combined angle “A” and “B”

Mammoth Mountain, California

Hal Shelton

Mammoth Mountain, California





Mammoth Mountain, California

Manipulation techniques

Terrain

1. **Exaggerate the vertical**
2. **Curve the projection plane** (terrain bending)
3. **Over emphasize distinctive features**
4. **Move mountains**
5. **Force break between mountain & background**

Camera

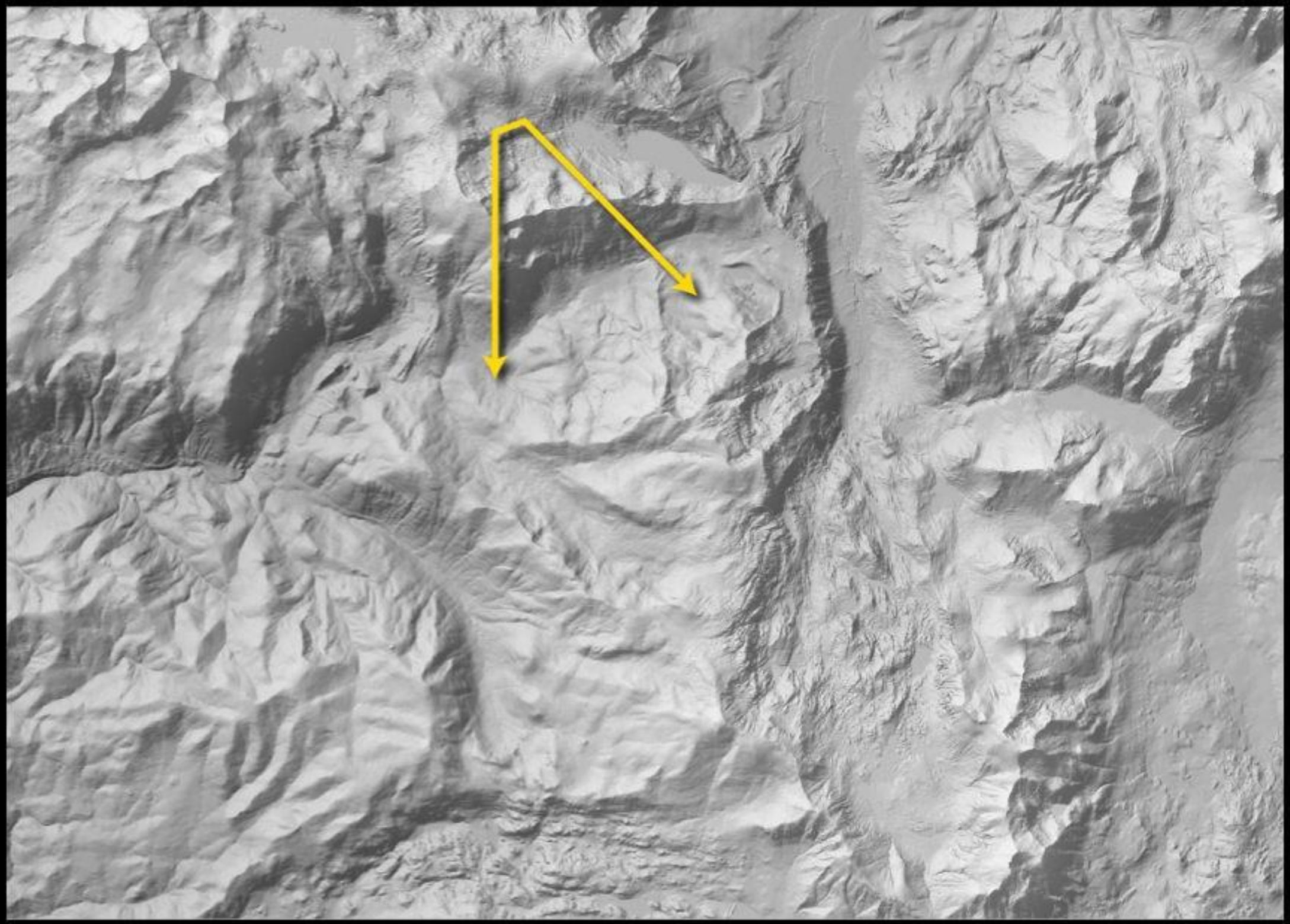
1. **Adjust camera field of View**
2. **Merge multiple view points**
3. **Compress the “x” dimension of the image**

Jay Peak summit

One more mountain ski mapmaker to look at…

Sierra-at-Tahoe, 2008-2014, Alex Tait

Sierra-at-Tahoe, camera location



Sierra-at-Tahoe, NSD render, 1.5x, 65mm camera